

(12) **UK Patent Application** (19) **GB** (11) **2 182 320** (13) **A**

(43) Application published 13 May 1987

(21) Application No **8624179**

(22) Date of filing **8 Oct 1986**

(30) Priority data

(31) **8525300**

(32) **14 Oct 1985**

(33) **GB**

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(51) INT CL⁴

B65D 47/36

(52) Domestic classification (Edition I)

B8T EDP

U1S 1111 B8T

(56) Documents cited

GB A 2165531

GB 0623087

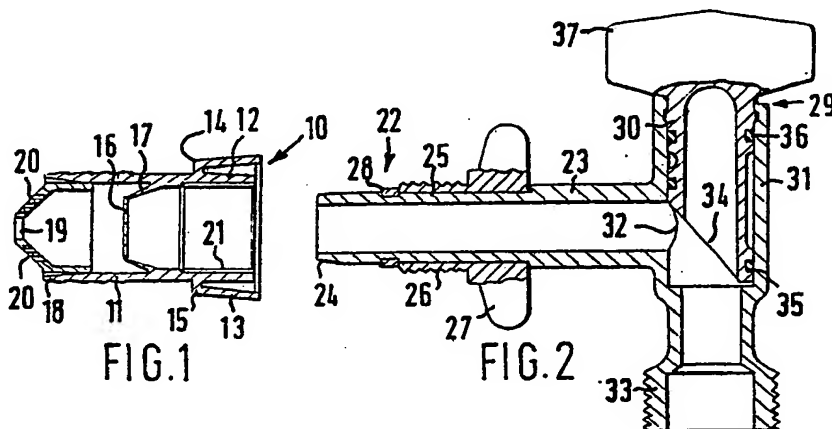
(58) Field of search

B8T

**Selected US specifications from IPC sub-classes B65D
B67D**

(54) **Cask closures**

(57) A keystone bung (10) and a cask connector (22) for beverage casks are disclosed; the bung having an outer periphery (13) constructed to seal with a given keystone and a throughbore (11) closed by a sealing diaphragm (16); the throughbore having an internal screw thread (21) to mate with an external thread (26) on the cask connector so that it can be screwed into the throughbore and a tapered inner end (24) of the connector can rupture the diaphragm to open the bung.



Best Original

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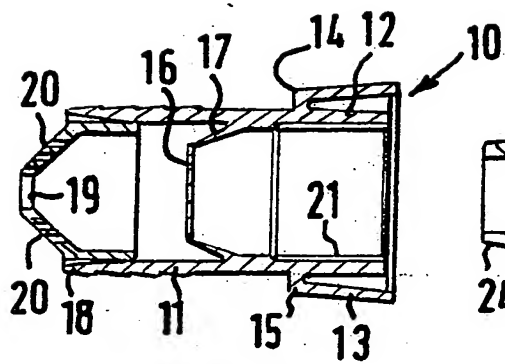


FIG. 1

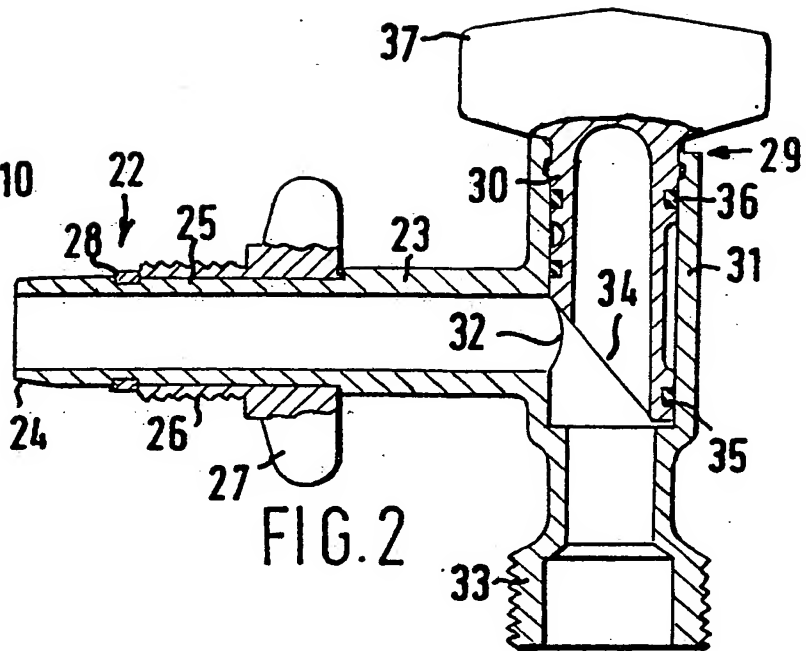


FIG. 2

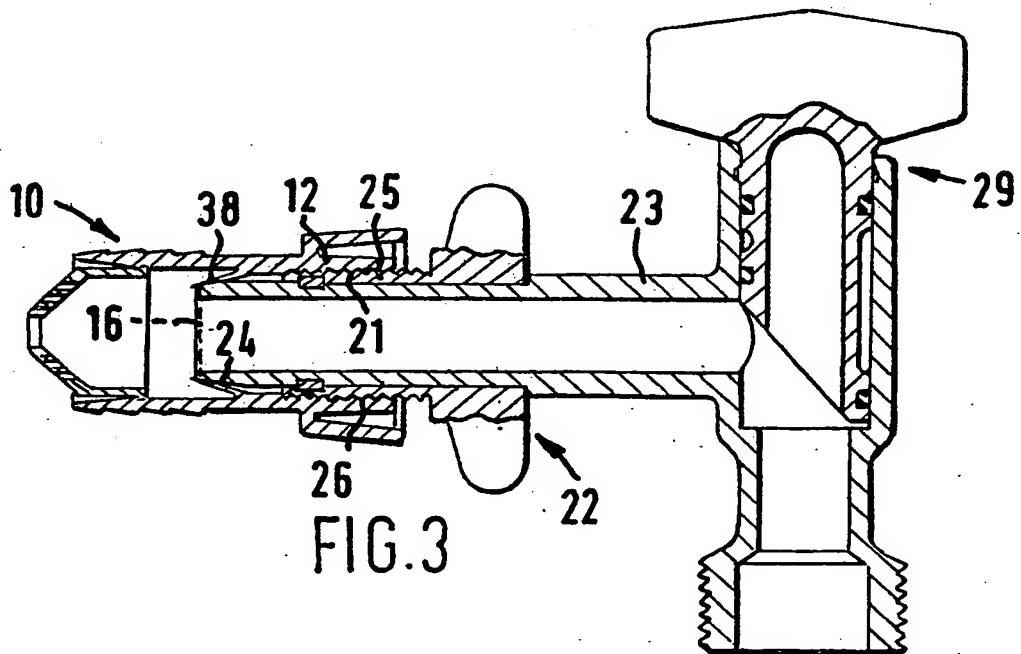
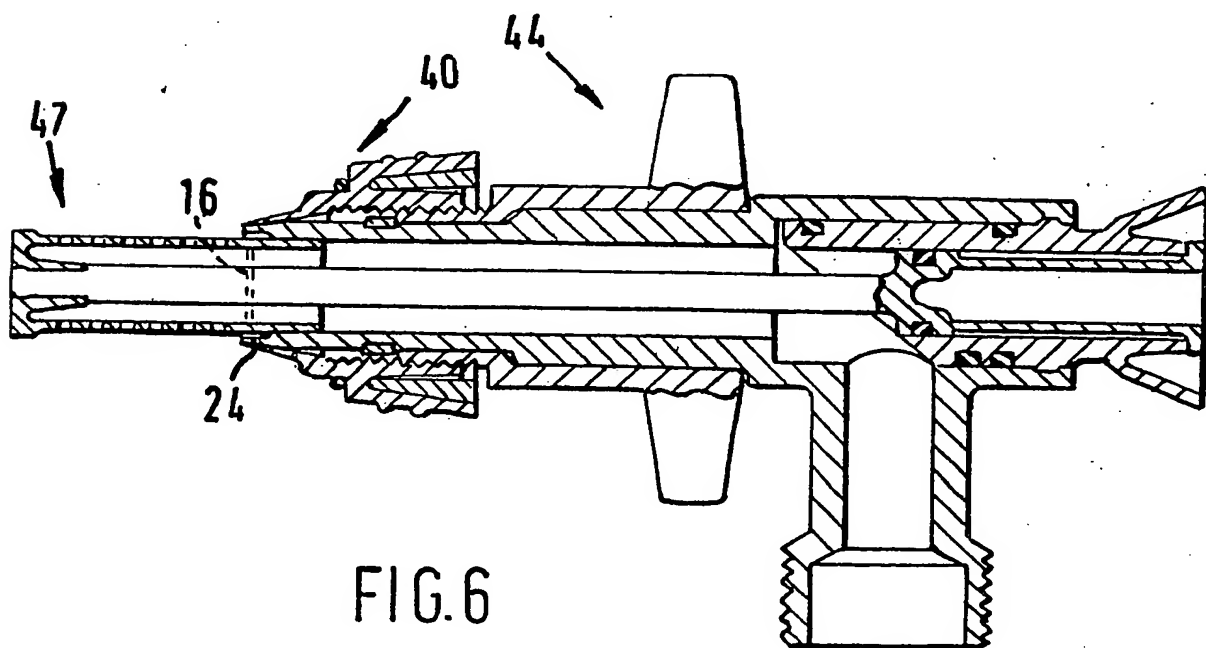
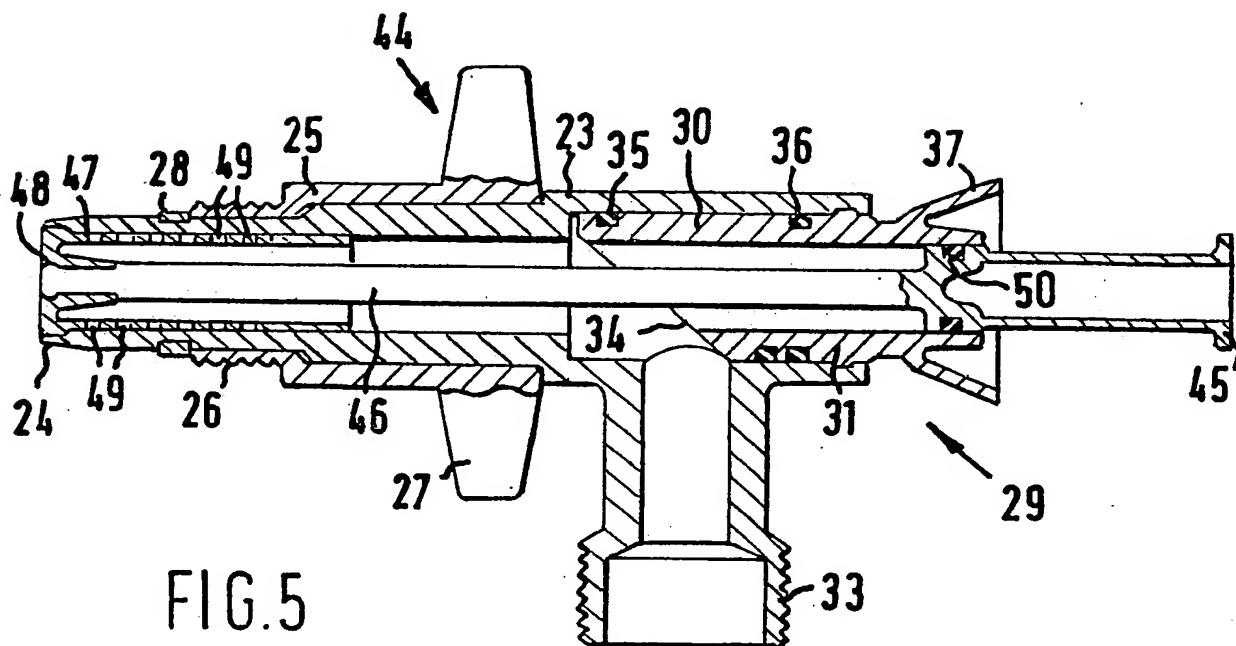
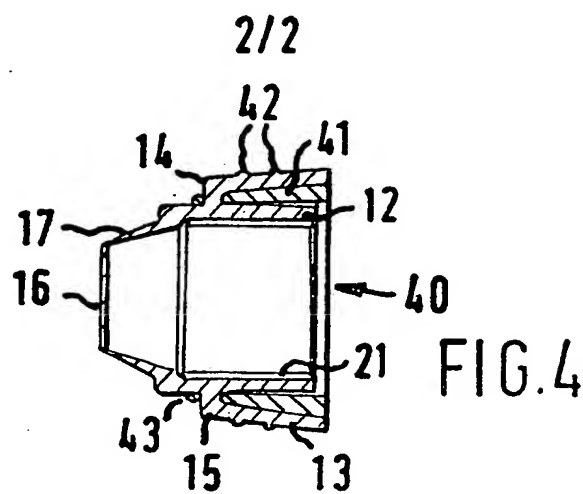


FIG. 3



SPECIFICATION

Container closures

- 5 This invention relates to closures for containers and particularly relates to bungs and connectors for casks, barrels and the like beverage containers.
- Beer is traditionally dispensed from a racked cask having a beer tap driven by a mallet through the
- 10 keystone bung in the bottom or lower end of the cask; the beer tap being used to dispense beer directly or, more usually when the casks are racked in a cellar below a bar, being connected to pipe lines to be dispensed by a beer engine or pump on the bar.
- 15 Outflow of beer is controlled by inflow of air past or through a shive peg in the shive bung in the top of the cask. Although carbon dioxide may sometimes be introduced through the shive bung to preserve the beer in the opened cask, the whole dispense system
- 20 is essentially a low pressure system. This being in contradistinction to the high pressure dispense systems for keg beers, lagers and other beverages.
- Both keystone and shive bung holes are inwardly tapered and the two bungs are conventionally made
- 25 of wood, each have a central bore (of differing sizes) and are each sealed, for transit of the filled cask, by a plug; also usually of wood. The keystone bung is opened by the sealing plug being knocked into the cask by the inner end of the beer tap as it is driven in.
- 30 The tap having an elongate, tapering inlet with a blind bore; radial holes in the inner end portion forming an inlet filter. The tap is usually driven in so quickly that little or no beer leaks out before the inlet seals in the keystone bung. Similarly, the shive plug
- 35 is driven into the cask and a suitable shive peg introduced.
- It is an object of the present invention to provide an improved keystone bung and cask connector that obviates the need to drive a bung seal into filled
- 40 casks.
- According to the present invention, a keystone bung for a beverage cask comprises an outer periphery constructed to seal with a given keystone and a through bore closed by a sealing diaphragm,
- 45 the through bore having an internal screw thread to mate with an externally threaded cask connector; the diaphragm being designed to be ruptured by a cask connector screwed into the through bore, to open the bung.
- 50 In an embodiment of the present invention, the bung outer periphery comprises a frusto-conical skirt attached to the bung and an annular wedge is provided to fit within the skirt and expand it into sealing engagement within a given keystone.
- 55 In another embodiment of the present invention, the sealing diaphragm is a separate unit that can be fitted from outside the bung into sealing engagement in the through bore, an externally threaded plug being provided to temporarily seal the
- 60 bung. By this means additions, such as finings, may be put into the cask after it has been filled and the keystone bung inserted; the plug being unscrewed, the finings introduced, the diaphragm snapped into place and, if necessary, the plug replaced for
- 65 additional sealing security.

Also according to the present invention, a cask connector has an external thread to mate with the internal thread in the through bore of a keystone bung and a tapered inner end which can rupture the

70 sealing diaphragm to open the bung.

In an embodiment of the present invention, the connector has a duct with a filter axially slidable therein and means are provided to extend the filter from the inner end of the connector after insertion

75 into a bung and rupture of a diaphragm.

The above and other features of the present invention are illustrated, by way of example in the Drawings, wherein:-

Figure 1 is a sectional elevation of a first

80 embodiment of a keystone bung in accordance with the invention;

Figure 2 is a sectional elevation of a first embodiment of a cask connector in accordance with the present invention;

85 *Figure 3* is a sectional elevation of the connector of *Figure 2* inserted into the bung of *Figure 1*;

Figure 4 is a sectional elevation of a second embodiment of a keystone bung in accordance with the present invention;

90 *Figure 5* is a sectional elevation of a second embodiment of a cask connector in accordance with the present invention; and,

Figure 6 is a sectional elevation of the connector of *Figure 5* inserted in the bung of *Figure 4*.

95 As shown by *Figure 1*, a keystone bung 10 consists of a moulding of relatively soft plastics material in the form of a hollow cylinder 11 having at its outside end 12 an outer frusto-conical skirt 13 with a radially outwardly directed flange 14 joining the inner end 15

100 of the skirt to the outer wall of the cylinder. The function of the skirt is to be sufficiently mobile and flexible to seal with a range of keystone holes.

Partway down the inside of the cylinder is an integral diaphragm 16 that is joined to the inner wall

105 of the cylinder 11 by an axially and radially inwardly directed flange 17; the flange is shown to taper from the cylinder wall to the diaphragm. The diaphragm has a weakened ring (not shown) running most of the way around within the periphery of the diaphragm;

110 the weakened ring is interrupted in one place, effectively leaving a connecting tang. In use, introduction of a cask connector into the through bore formed by cylinder 11 will preferentially tear the diaphragm along the weakened ring so that a disc is

115 torn away from the diaphragm but will remain connected thereto by the tang.

The inner end 18 of the bung is covered by a separate filter 19 that has a snap fit engagement within the cylinder through bore. The filter is

120 generally cup-shaped and is provided with a series of axial holes 20 forming the filter proper.

The outer end portion 12 of the cylinder 11 has an internal thread 21 to mate with a threaded cask connector; described below.

125 As shown by *Figure 2*, a mating cask connector 22 has an inlet pipe 23; the inner, input end of which is tapered at 24. Surrounding the inlet pipe is a freely rotatable collar 25 having an external thread 26 to mate with internal thread 21 in the keystone bung 10.

130 The collar can be rotated by means of integral wings

27 and is axially retained on the inlet pipe 23 by a locking ring 28. The inlet pipe 23 has, at its outer end, an integral tap 29; consisting of a spigot 30 rotatable in a cylindrical tap body 31, at right angles to the inlet

5 pipe, which opens radially at 32 into the tap body. The tap has an outlet 33 axially below the tap body 31, the outlet 33 being externally threaded to permit connection to conventional cellar pipework. The tap spigot 30 is angled at its lower end 34 so that, in the position shown, fluid can flow from the inlet pipe 23, through port 32 into the valve body 31, below the spigot end 34 and thence to the outlet 33. The tap spigot 30 is sealed in the tap body 31 by a sealing ring 35 housed in an elliptical groove about the angled

15 spigot end 34. The upper end of the spigot 30 is sealed in the tap body 31 by a further sealing ring 36. Rotation of the spigot 30, by an integral handle 37, through 180° will seal inlet port 32 and close the tap.

As shown by Figure 3, the cask connector 22 is fitted to the keystone bung 10 by introducing the connector inlet pipe 23 into the bung portion 12 until the cask thread 26 engages the bung thread 21, rotation of the cask collar 25 will draw the connector into the bung forcing the connector inner end 24 against the bung diaphragm 16 until the weakened ring tears and the diaphragm is ruptured. The diameter of the weakened ring is such that the remaining diaphragm stretches tightly around and seals against the inlet pipe 23, as shown at 38.

30 By providing the filter at the inner end of the keystone bung instead of at the inner end the connector, the cask connector is easier to clean, having a simple readily accessible flow path.

In an unillustrated embodiment, the keystone bung diaphragm and supporting flange form a separate structure designed to be introduced through the outer end of the cylinder and be a sealed snap-fit therein. A screwed plug is supplied to mate with the internal thread in the through duct and seal the bung; the plug having a radially outwardly directed flange with a sealing ring trapped thereunder for this purpose.

By this means a cask may be filled and then temporarily sealed by means of the plug so that later additions to the cask contents may be made. For example, the cask could be filled with beer at the brewery, closed with a plugged keystone bung and transported to a distribution depot where the plug could be removed, finings added and the cask resealed by snapping in a diaphragm. The plug could be replaced for further sealing security during onwards transportation of the filled cask.

The keystone bung 40 shown by Figure 4 is generally the same as that shown by Figure 1 and like parts have been given the same references. In this bung, outer portion 12 does not extend inwards beyond the diaphragm 16 because there is no provision for a filter.

An annular, frusto-conical wedge 41 fits within the skirt 13 and, when the bung is fitted into a keystone, driving the wedge into the bung will expand the skirt into sealing engagement with the keystone. The skirt may also have peripheral outer ribs 42 to improve sealing between bung and cask. Finally an 'O' ring 43 may be fitted about cylinder 12 and be trapped under

flange 14 to provide further sealing with a cask.

The cask connector 44 shown in Figure 5 has some similarities to the cask connector 22 of Figure 2, similar parts have been given the same references. In this embodiment, the tap 29 is axially aligned with the inlet pipe 23, the outlet 33 emerging downwardly, radially from the tap body 31.

The spigot 30 has an axial bore in which slides a plunger 45 and from which a push rod 46 extends to a filter 47, axially slidable within the tap body 23. The filter 47 is generally cylindrical with a closed end 48, to which the push rod connects, and radial holes 49 form the filter proper. By sliding the plunger 45 in and out of the spigot 30, the filter 47 can be retracted into and extended out of the connector inner end 24. The filter is shown fully retracted in Figure 5. An 'O' ring 50 seals plunger 45 in spigot 30.

Figure 6 shows the connector 44 screwed into a bung 40 with the filter 47 fully extended. The retractable filter has two advantages, firstly the filter is protected as the connector inner end 24 ruptures the bung diaphragm 16 and secondly, the filter can be left retracted until the cask has been installed and all sediments settled out, this prevents the filter from being prematurely clogged.

CLAIMS

1. A keystone bung for a beverage cask, the bung comprising an outer periphery constructed to seal with a given keystone and a through bore closed by a sealing diaphragm, the through bore having an internal screw thread to mate with an externally threaded cask connector; the diaphragm being designed to be ruptured by a cask connector screwed into the through bore, to open the bung.

2. A keystone bung as claimed in claim 1, wherein the bung outer periphery is a frusto-conical skirt attached to the bung and an annular wedge is provided to fit within the skirt and expand it into sealing engagement within a given keystone.

3. A keystone bung as claimed in claim 1 or claim 2, wherein the sealing diaphragm is designed to seal around a cask connector screwed into the through bore and rupturing the diaphragm.

4. A keystone bung as claimed in any of claims 1 to 3, wherein a filter is provided on the inner end of the bung.

5. A keystone bung as claimed in any of claims 1 to 4, wherein the sealing diaphragm is a separate unit that can be fitted from outside the bung into sealing engagement in the through bore, an externally threaded plug being provided to screw into and temporarily seal the bung.

6. A keystone bung substantially as described with reference to or as shown by Figures 1, 3, 4 and 6 of the Drawings.

7. A cask connector for use with a keystone bung as claimed in any of claims 1 to 6, the connector being externally threaded to mate with the internal thread of the bung through bore and having a tapered inner end with a duct therethrough, whereby the connector can be screwed into the throughbore and the tapered inner end can rupture the diaphragm to open the bung.

8. A cask connector as claimed in claim 7 and provided with a tap, to control flow of beverage from a cask.
9. A cask connector as claimed in claim 7 or claim 5 8, wherein the connector duct has a filter axially slidable therein and means are provided to extend the filter from the inner end of the connector after rupture of a diaphragm.
10. A cask connector as claimed in any of claims 7 10 to 9, wherein the external screw thread is provided on a collar freely rotatable about and axially retained on the connector.
11. A cask connector substantially as described with reference to or as shown by Figures 2, 3, 5 and 6 15 of the Drawings.

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